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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,613	07/30/2003	Ming Zheng	CL2191US NA	3957

EXAMINER	
FORMAN, BETTY J	

ART UNIT	PAPER NUMBER
1634	

NOTIFICATION DATE	DELIVERY MODE
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-Legal.PRC@usa.dupont.com

**Office Action Summary**

Application No.

10/630,613

Applicant(s)

ZHENG ET AL.

Examiner

BJ Forman

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 and 25-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20, 21 and 25-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

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## **FINAL ACTION**

### ***Status of the Claims***

1. This action is in response to papers filed 7 August 2007 in which claims 20, 25, 27, 30 were amended and claims 22-24 were canceled. The amendments have been thoroughly reviewed and entered.

The previous rejections in the Office Action dated 11 May 2007 are withdrawn in view of the amendments. Applicant's arguments have been thoroughly reviewed but are deemed moot in view of the amendments, withdrawn rejections and new grounds for rejection. New grounds for rejection, necessitated by the amendments, are discussed.

Claims 20-21, 25-31 are under prosecution.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 20-21 and 25-27, 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelley et al (U.S. Patent No. 6,958,216, filed 9 January 2002) and Alivisatos et al (Nature, 1996, 382: 609-611).

Regarding Claims 20 and 30, Kelley et al disclose a geometric nanostructure comprising at least three complexes spatially arranged in an ordered geometric pattern (Fig. 13), the complexes comprising a nanoparticle and a single stranded DNA ligand (Column 7, lines 24-35) wherein the ligand has a proximal portion attached to the nanoparticle and a distal portion wherein the complexes are each affixed to each other through the distal portions (Column 7, lines 24-35 and Example 6, Column 16, lines 25-52). Kelley et al teach controlled assembly of

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the dimer or trimer nanostructure via sequence-specific interaction of the particles (Column 16, lines 39-44) and further teach the controlled density of DNA molecules on the beads to produce DNA wires (Column 7, lines 24-50) but they do not specifically teach a single DNA molecule on the beads.

Alivisatos et al teach a similar dimer or trimer nanostructure comprising at least three complexes spatially arranged in an ordered geometric pattern (Fig. 1), the complexes comprising a nanoparticle and a single stranded DNA ligand (Column 7, lines 24-35) wherein the ligand has a proximal portion attached to the nanoparticle and a distal portion wherein the complexes are formed through the distal portions of the DNA ligands (page 610). Alivisatos et al further teach the DNA ligands are coupled with a 10-fold excess nanoparticles to obtain desired stoichiometries of oligonucleotide and Au cluster (page 610, right column) and illustrate single DNA/particle (Fig. 1-2). Alivisatos et al also teaches that nanocrystals coupled with "a single-stranded DNA" makes it possible to self-assemble the nanocrystal molecules into two and three-dimensional complexes (page 610, left column). This clearly suggests a single, single-stranded DNA molecule/particle is desired and obtainable.

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to combine the teachings of Alivisatos et al and Kelley et al to obtain the claimed nanostructure. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success based on the combined teaching. One of ordinary skill would have desired the single DNA ligand/particle as claimed so as to provide self-assembling particles into specific pattern geometries as desired in the art (Alivisatos, Abstract).

Regarding Claims 21 and 31, Kelley et al disclose the nanoparticle having a diameter of 2 to 10 nm (Column 13, lines 53-55). Alivisatos et al teach the particles have a diameter of "about" 2 nm (page 610, right column).

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Regarding Claim 25-26, Kelley et al disclose the nanostructure wherein the ligand is derivatized with a thiol group at the distal end (Example 3). Alivisatos et al teach the oligonucleotides are derivatized with a thiol group (page 610).

Regarding Claim 27, Kelley et al disclose the nanostructure wherein the DNA ligands form complexes by hybridization of distal portions of the nucleic acid (Fig. 135). Alivisatos et al teach the nanostructure wherein the DNA ligands form complexes by hybridization (Fig. 1).

4. Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelley et al (U.S. Patent No. 6,958,216, filed 9 January 2002) and Alivisatos et al (Nature, 1996, 382: 609-611) as applied to Claim 25 above and further in view of Mirkin et al (U.S. Patent No. 6,361,944, filed 25 June 1999).

Regarding Claims 28-29, Kelley et al and Alivisatos et al teach the elements of Claim 25 as discussed above wherein the DNA ligands are derivatized with functional groups for attachment to the nanoparticles, but the references do not teach binding partners e.g. biotin/streptavidin attachments. However, biotin/streptavidin attachment to nanoparticles was well known and routinely practiced in the art at the time the claimed invention was made as taught by Mirkin et al (Column 17, lines 41-45).

Mirkin et al teach numerous methods, well known in the art, are useful for attaching DNA to nanoparticles (Column 17). This clearly suggests the numerous well-known methods of attachment function equally. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the well-known biotin/streptavidin attachment to the DNA/nanoparticle attachment of Kelley and/or Alivisatos. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success based on its well known use and suitability as taught by Mirkin.

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The courts have stated that selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297, and *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (MPEP § 2144.07).

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

#### Conclusion

6. No claim is allowed.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

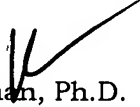
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

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For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.



BJ Forman, Ph.D.  
Primary Examiner  
Art Unit: 1634  
September 25, 2007

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